

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A sound field correcting method in an audio system which includes a plurality of variable gain type frequency discriminating means for discriminating input audio signals into a plurality of frequencies, and delaying means for adjusting delay times of the audio signals that are frequency-discriminated by the variable gain type frequency discriminating means, whereby the audio signals are supplied to sound generating means via the variable gain type frequency discriminating means and the delaying means, said method comprising:

a first step of supplying a noise to the sound generating means via the variable gain type frequency discriminating means and the delaying means, and then detecting a first reproduced sounds-sound generated by the sound generating means;

a second step of analyzing frequency characteristics of the first reproduced sounds sound based on a first detection results-result detected by said first step in answer to the variable gain type frequency discriminating means;

a third step of supplying the noise to the sound generating means via the plurality of variable gain type frequency discriminating means and the delaying means, and then detecting a thesecond reproduced sounds-sound generated by the sound generating means;

a fourth step of analyzing ~~delay~~frequency characteristics of the second reproduced ~~sound~~sound based on ~~a the second~~ detection ~~results~~result detected by said third step ~~and an~~ analysis result obtained by said second step,

wherein the frequency characteristics are analyzed using a value obtained by multiplying the first detection result by the second detection result; and

a fifth step of adjusting frequency characteristics of the variable gain type frequency discriminating means based on the frequency characteristics obtained by said second step ~~and the frequency characteristics obtained by said fourth step. and adjusting delay times of the delaying means based on the delay characteristics obtained by said fourth step,~~

~~wherein the reproduced sounds generated by the sound generating means are detected plural times by the same sound generating means and by repeating said first step plural times, the frequency characteristics are analyzed in said second step based on~~using multiplied a value~~value obtained by plural times detection results~~multiplying the first detection results by the second detection results, and

~~wherein the frequency characteristics of the variable gain type frequency discriminating means are adjusted in said fifth step based on~~using the frequency characteristics obtained from~~using the multiplied said value~~value.

2. (canceled).

3. (currently amended): A sound field correcting method in an audio system according to claim 1, wherein, in said first step, the first reproduced sound~~sounds~~ generated by the sound generating means ~~are~~is detected under such a condition that the frequency characteristics of the variable gain type frequency discriminating means are adjusted previously by using target curve data.

4. (currently amended): A sound field correcting method in an audio system according to claim 1, wherein ~~the~~ reproduced sounds generated by said sound generating means are detected plural times by repeating said third step plural times, the delay characteristics are analyzed in said fourth step based on an average value of plural times detection results, and the delay times of the delaying means are adjusted in said fifth step based on delay characteristics obtained from the average value.

5. (currently amended): A sound field correcting method in an audio system which supplies a plurality of input audio signals to a plurality of sound generating means via a plurality of signal transmission lines, each of the signal transmission lines including a plurality of variable gain type frequency discriminating means for discriminating input audio signals into a plurality of frequencies, channel-to-channel level adjusting means for adjusting levels of the audio signals, and delaying means for adjusting delay times of the audio signals that are frequency-discriminated by the variable gain type frequency discriminating means, whereby the audio signals are supplied to sound generating means via the variable gain type frequency

discriminating means, the channel-to-channel level adjusting means, and the delaying means, said method comprising:

a first step of supplying a noise to respective signal transmission lines via the variable gain type frequency discriminating means, the channel-to-channel level adjusting means, and the delaying means, and then detecting a first reproduced sound generated by the sound generating means via respective signal transmission lines;

~~and then a second step of~~ analyzing frequency characteristics of the first reproduced sound via respective signal transmission lines based on a first detection result detected by said first step in answer to the variable gain type frequency discriminating means;

a third step of supplying the noise to the respective signal transmission lines via the variable gain type frequency discriminating means, the channel-to-channel adjusting means and the delaying means, and then detecting a second reproduced sound generated by the sound generating means via respective signal transmission lines;

a fourth step of analyzing frequency characteristics of the second reproduced sound via respective signal transmission lines based on second detection result detected by said third step and an analysis result analyzed by said second step,

wherein the frequency characteristics are analyzed using a value obtained by multiplying the first detection result by the second detection result;

a ~~fifth~~ second step of adjusting frequency characteristics of the variable gain type frequency discriminating means on respective signal transmission lines based on the frequency

characteristics obtained by said ~~second~~first step and the frequency characteristics obtained by said fourth step;

a ~~sixth~~third step of supplying the noise to respective signal transmission lines via the variable gain type frequency discriminating means, the channel-to-channel level adjusting means, and the delaying means, then detecting a third ~~the reproduced sound~~sound generated by the sound generating means via respective signal transmission lines, and then analyzing delay characteristics of the third reproduced ~~sound~~sound via respective signal transmission lines based on detection results;

a ~~seventh~~fourth step of adjusting delay times of the delaying means on respective signal transmission lines based on the delay characteristics obtained by said ~~sixth~~third step;

~~a~~an eighth~~fifth~~ step of supplying the noise to respective signal transmission lines via the variable gain type frequency discriminating means, the channel-to-channel level adjusting means, and the delaying means, then detecting ~~the~~a fourth reproduced ~~sound~~sound generated by the sound generating means via respective signal transmission lines, and then analyzing levels of the fourth reproduced sounds via respective signal transmission lines based on detection results; and

a ~~ninth~~sixth step of adjusting the channel-to-channel level adjusting means based on analyzed results of the levels of the fourth reproduced ~~sound~~sound obtained by said ~~eighth~~fifth step via respective signal transmission lines;

~~wherein the reproduced sounds generated by the sound generating means during said first step are detected plural times by the same sound generating means and by repeating said first step a plurality of times.~~

6. (currently amended): A sound field correcting method in an audio system according to claim 5, wherein, in said first step, the first reproduced sound~~s~~ generated by the sound generating means ~~are~~is detected under such a condition that the frequency characteristics of the variable gain type frequency discriminating means are adjusted previously by using target curve data.

7. (original): A sound field correcting method in an audio system according to claim 5, wherein said first step and said second step are repeated plural times, and said first step is performed under such a condition that the frequency characteristics of the variable gain type frequency discriminating means are adjusted in said second step.

8. (currently amended): A sound field correcting method in an audio system according to claim 5, wherein, in said ~~sixth~~ninth step, an adjusted amount of the plurality of channel-to-channel level adjusting means are corrected such that a spectrum average level of the reproduced sounds reproduced by the plurality of sound generating means are made flat over all audio frequency bands.

9. (original): A sound field correcting method in an audio system according to claim 5, wherein the audio system is a multi-channel audio system that supplies the audio signals to all frequency band sound generating means having a reproducing frequency characteristic that is substantially equal to the audio frequency band and a low frequency band exclusively reproducing sound generating means having a reproducing frequency characteristic that is substantially equal to the low frequency band of the audio frequency band.

10. (currently amended): A sound field correcting method in an audio system, said method comprising:

supplying a noise to speakers via variable gain type frequency discriminator circuits and delay circuits to generate a first reproduced sound, and then; detecting the first reproduced sound generated by the speakers so as to obtain a first detection result;

analyzing frequency characteristics of the first reproduced sound based on the first detection result so as to obtain first frequency characteristics and an analysis result;

supplying the noise to the speakers via the variable gain type frequency discriminator circuits and the delay circuits to generate a second reproduced sound, and then detecting the second reproduced sound generated by the speakers so as to obtain a second detection result;

analyzing frequency characteristics of the second reproduced sound based on the second detection result and the analysis result so as to obtain second frequency characteristics.

wherein the frequency characteristics are analyzed using a value obtained by multiplying the first detection result by the second detection result;

adjusting frequency characteristics of the variable gain type frequency discriminator circuits based on the first frequency characteristics and the second frequency characteristics;

supplying the noise to the speakers via the variable gain type frequency discriminator circuits and the delay circuits to generate a thirdsecond reproduced soundssound;

detecting the ~~second~~ third reproduced sounds generated by the speakers;

analyzing delay characteristics of the ~~thirdsecond~~ reproduced ~~soundssound~~; and

~~adjusting frequency characteristics of the variable gain type frequency discriminator circuits based on the frequency characteristics obtained by said analyzing frequency characteristics of the first reproduced sounds; and~~

adjusting delay times of the delay circuits based on the delay characteristics obtained by said analyzing delay characteristics of the ~~second~~ third reproduced ~~soundssound~~;

~~wherein the noise is supplied to the same speakers a plurality of times and the first reproduced sounds generated by the speakers are detected a plurality of times;~~

~~wherein the frequency characteristics are analyzed based on multiplied value created from results of analyzing frequency characteristics a plurality of times; and~~

~~when the frequency characteristics of the variable gain type frequency discriminator circuits are adjusted based on the frequency characteristics obtained from the multiplied values.~~

11. (currently amended): A sound field correcting method in an audio system according to claim 10, wherein, the first reproduced ~~sounds-sound~~ generated by the ~~sound generators-speakers~~ are detected under such a condition that the frequency characteristics of the variable gain type frequency discriminator circuit are adjusted previously by using target curve data.

12. (currently amended): A sound field correcting method in an audio system according to claim 10, wherein the second reproduced sounds generated by said ~~sound generators-speakers~~ are detected a plurality of times, the delay characteristics are analyzed based on an average value of results of said detection said plurality of -times, and the delay times of the delay circuits are adjusted based on delay characteristics obtained from the average value.

13. (currently amended): A sound field correcting method comprising:
supplying a noise to respective signal transmission lines via variable gain type frequency discriminator circuits, channel-to-channel level adjusting circuits, and delay circuits, and then detecting a first reproduced ~~sounds-sound~~ generated by sound generators via respective signal transmission lines so as to obtain a first detection result;

~~and then~~ analyzing frequency characteristics of the first reproduced sound via respective signal transmission lines based on the first detection results so as to obtain first frequency characteristics and an analysis result;

supplying the noise to respective signal transmission lines via the variable gain type frequency discriminator circuits, the channel-to-channel level adjusting circuits, and the delay circuits, and then detecting a second reproduced sound generated by the sound generators via the respective signal transmission lines so as to obtain a second detection result;

analyzing frequency characteristics of the second reproduced sound based on the second detection result and the analysis result so as to obtain second frequency characteristics,

wherein the frequency characteristics are analyzed using a value obtained by multiplying the first detection result by the second detection result;

adjusting frequency characteristics of the variable gain type frequency discriminator circuits on respective signal transmission lines based on the ~~analyzed~~ first frequency characteristics and the second frequency characteristics;

supplying the noise to respective signal transmission lines via the variable gain type frequency discriminator circuits, the channel-to-channel level adjusting circuits, and the delay circuits, then detecting a third ~~the reproduced sound~~ generated by the sound generators via respective signal transmission lines, and then analyzing delay characteristics of the third reproduced sound via respective signal transmission lines based on detection results;

adjusting delay times of the delay circuits on respective signal transmission lines based on the analyzed delay characteristics;

supplying the noise to respective signal transmission lines via the variable gain type frequency discriminator circuits, the channel-to-channel level adjusting circuits, and the delay circuits, then detecting ~~the~~ a fourth reproduced sound generated by the sound generators via respective signal transmission lines, and then analyzing levels of the fourth reproduced sound via respective signal transmission lines based on detection results; and

adjusting the channel-to-channel level adjusting circuits based on the analyzed results of the levels of the fourth reproduced sound via the respective signal transmission lines.

14. (currently amended): A sound field correcting method in an audio system according to claim 13, wherein, the first reproduced sound generated by the sound generators ~~are~~ is detected under such a condition that the frequency characteristics of the variable gain type frequency discriminator circuits are adjusted previously by using target curve data.

15. (currently amended): A sound field correcting method in an audio system according to claim 13, ~~wherein~~ further comprising:

supplying a noise to respective signal transmission lines via variable gain type frequency discriminator circuits, channel-to-channel level adjusting circuits, and delay circuits, then detecting a fifth reproduced sound generated by the sound generators via respective

signal transmission lines, and then analyzing frequency characteristics of the fifth reproduced ~~sound~~sound via respective signal transmission lines based on detection results, and

wherein said adjusting frequency characteristics of the variable gain type frequency discriminator circuits on respective signal transmission lines based on ~~the~~ analyzed frequency characteristics are repeated a plurality of times.

16. (currently amended): A sound field correcting method in an audio system according to claim 13, wherein, in said adjusting the channel-to-channel level adjusting circuits based on the analyzed results of the levels of the fourth reproduced sounds via the respective signal transmission lines, an adjusted amount of the plurality of channel-to-channel level adjusting circuits are corrected such that a spectrum average level of ~~the~~ reproduced sounds reproduced by the plurality of sound generators are made flat over all audio frequency bands.

17. (previously presented): A sound field correcting method in an audio system according to claim 13, wherein the audio system is a multi-channel audio system that supplies the audio signals to all frequency band sound generators having a reproducing frequency characteristic that is substantially equal to the audio frequency band and to a low frequency band exclusively reproducing sound generators having a reproducing frequency characteristic that is substantially equal to the low frequency band of the audio frequency band.

18. (withdrawn): A sound field correcting method in an audio system according to claim 1, wherein a size of speakers of said audio system is determined and said method is altered based on said determined speaker size.

19. (withdrawn): A sound field correcting method in an audio system according to claim 5, wherein a size of speakers of said audio system is determined and said method is altered based on said determined speaker size.

20. (withdrawn): A sound field collecting apparatus comprising:
a speaker that generates reproduced sound;
a sound collecting member that collects sound data with respect to a plurality of channels;
a first member that compares a collected sound data with a predetermined threshold value with respect to each of said channels;
a second member that determines a size of the speaker according to a comparison result of the first member; and
a third member that adjusts a frequency characteristic of the reproduced sound according to the determined size of the speaker by the second member.

21. (withdrawn): The sound field collecting apparatus according to claim 20, wherein the collected sound data is collected in a plurality of frequency bands, and

the collected sound data is an average of the collected sound data with respect to each of said channels.

22. (withdrawn): The sound field collecting apparatus according to claim 21, wherein the second member determines the speaker has a large size when the second member obtains a result that the average is larger than the predetermined threshold value.

23. (withdrawn): The sound field collecting apparatus according to claim 21, wherein the second member determines the speaker has a small size when the second member obtains a result that the average is smaller than the predetermined threshold value.

24. (withdrawn): The sound field collecting apparatus according to claim 23, wherein a frequency characteristic with respect to the small-size speaker is not adjusted when the second member determines that the speaker has the small size.

25. (withdrawn): The sound field collecting apparatus according to claim 22, wherein a frequency characteristic with respect to the large-size speaker is adjusted when the second member determines that the speaker has the large size.